(19) OFICIUL DE STAT
PENTRU INVENŢII ŞI MĂRCI
Bucureşti

ROMANIA

(11) Nr. brevet: 113267 B1
(51) Int.Cl.[6] E 21 B 10/32;
E 21 B 7/00;

(12) BREVET DE INVENŢIE

Hotărârea de acordare a brevetului de invenţie poate fi revocată
în termen de 6 luni de la data publicării

(21) Nr. cerere: 94-00770

(22) Data de depozit: 09.05.1994

(30) Prioritate:

(41) Data publicării cererii:
BOPI nr.

(42) Data publicării hotărârii de acordare a brevetului:
28.05.1998 BOPI nr. 5/1998

(45) Data eliberării şi publicării brevetului:
BOPI nr.

(61) Perfecţionare la brevet:
Nr.

(62) Divizată din cererea:
Nr.

(86) Cerere internaţională PCT:
Nr.

(87) Publicare internaţională:
Nr.

(56) Documente din stadiul tehnicii:
RO 77398

(71) Solicitant: OPREA STAN, BRAŞOV, RO; FILIP FLORIN NICOLAE, BRAŞOV, RO;

(73) Titular: OPREA STAN, BRAŞOV, RO; FILIP FLORIN NICOLAE, BRAŞOV, RO;

(72) Inventatori: OPREA STAN, BRAŞOV, RO; FILIP FLORIN NICOLAE, BRAŞOV, RO;

(74) Mandatar:

(54) SAPĂ DE FORAJ EXPANDABILĂ

(57) **Rezumat:** Invenţia se referă la o sapă de foraj expandabilă, utilizată pentru forajul sondelor pentru fluide, în minerit sau în alte lucrări industriale. Sapa de foraj expandabilă asigură introducerea elementelor tăietoare la talpa sondei şi schimbarea lor fără extragerea garniturii, prin faptul că este alcătuită din nişte role dinţate (1), fixate la capătul unui tub (2) de spălare şi ghidare. La capătul inferior al tubului (2) de spălare şi ghidare, sunt prevăzute nişte urechi de fixare (3), de care sunt articulate nişte braţe cardanice inferioare (4), corespunzătoare fiecărei role dinţate (1). Fiecare braţ cardanic inferior (4) este fixat într-un fus cardan (5) ce se află în interiorul unei role lărgitoare (6), la extremitatea căreia este montat un braţ cardanic superior (7). Braţul cardanic superior (7) este fixat pe un arc elicoidal (8), ce asigură expandarea sapei de foraj.

Revendicări: 1
Figuri: 3

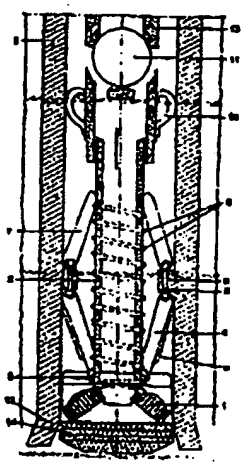


Fig. 1

RO 113267 B1

Invenția se referă la o sapă de foraj expandabilă, utilizată pentru forajul sondelor pentru fluide, în minerit sau în alte lucrări industriale.

Este cunoscută o sapă de foraj cu role multiple, alcătuită din niște subansambluri de lărgire, de absorbție, de ghidare și de colectare a detritusului .

Subansamblul de lărgire cuprinde o flanșă superioară, ce servește la realizarea legăturii cu o garnitură de foraj și care este solidarizată de o flanșă inferioară prin intermediul unui corp tubular și a unor nervuri.

De flanșe inferioară, sunt fixate niște juguri periferice, precum și niște suporturi de care sunt solidarizate niște juguri intermediare. De jugurile intermediare, sunt montate niște subansambluri de dislocare a rocii. De corpul tubular, sunt montați prin intermediul unor rulmenți radiali-axiali, un arbore tubular solidizat de o flanșă străbătută de o țeavă de absorbție.

Subansamblul de absorbție este rigidizat de un subansamblu de lărgire.

Subansamblul de ghidare și colectare cuprinde un corp tubular, de al cărui capăt este fixată o platformă tronconică cu baza mare dispusă spre în sus, în care sunt practicate găuri de circulație.

De corpul tubular și de platformă, sunt rigidizate niște nervuri, și în corp sunt montați prin intermediul unor rulmenți radiali-axiali, un arbore tubular, având un capăt solidarizat de o flanșă inferioară a subansamblului de absorbție cu ajutorul unor știfturi de poziționare. Între corp și arbore, există un spațiu inelar plin cu lubrifiant, etanșat față de exterior de către niște garnituri inelare.

Sapa de foraj expandabilă, conform invenției, asigură introducerea elementelor tăietoare la talpa sondei și schimbarea lor la uzură fără extragerea garniturii de prăjini prin aceea că este prevăzută cu niște urechi de fixare, dispuse pe tubul de spălare și ghidare, pe care sunt articulate niște brațe cardanice inferioare, corespunzătoare fiecărei role dințate, prevăzute cu niște elemente tăietoare, iar la partea superioară

a fiecărui braț cardanic inferior, este fixat un fus cardan ce se află în interiorul unei role lărgitoare, la extremitatea căruia este montat un braț cardanic superior fixat la rândul său, la partea superioară, pe extremitatea unui arc elicoidal, ce înconjoară tubul de spălare și ghidare, arcul elicoidal asigurând expandarea sapei de foraj și aducerea brațelor cardanice inferioare și superioare în poziție orizontală, la ieșirea din extremitatea garniturii de prăjini.

Prin aplicarea invenției, se obțin următoarele avantaje:

- reducerea numărului mare de marșuri executate pentru operațiunile de schimbare a sapelor;
- creșterea siguranței în exploatare;
- reducerea costurilor forajului.

Se dă, în continuare, un exemplu de realizare a invenției în legătură și cu fig. 1...3, care reprezintă:

- fig. 1, secțiune longitudinală prin sapa de foraj, expandabilă, aflată în interiorul garniturii de prăjini;
- fig. 2, - secțiune longitudinală prin sapa de foraj, expandabilă din fig.1, în poziție de lucru;
- fig. 3, vedere frontală, de jos a sapei de foraj, expandabile, din fig. 2 .

Sapa de foraj, expandabilă, conform invenției, este alcătuită din niște role dințate **1**, așezate la capătul inferior al unui tub **2** de spălare și ghidare. Pe tubul **2** de spălare și ghidare, sunt articulate cu ajutorul unor urechi de fixare **3**, niște brațe cardanice inferioare **4**, corespunzătoare fiecărei role dințate **1**, ce pot fi, de exemplu în număr de șase. Brațele cardanice inferioare **4** sunt prevăzute cu niște elemente tăietoare **a** care devin active în poziția de lucru a sapei.

Partea superioară a brațelor cardanice inferioare **4** susține un fus cardan **5**, ce se află dispus într-o rolă lărgitoare **6**, numărul rolelor lărgitoare **6** fiind egal cu numărul brațelor cardanice inferioare **4**. La extremitatea superioară a fusului cardan **5**, este montat un braț cardanic

superior **7** a cărui parte superioară este fixată pe extremitatea unui arc elicoidal **8** de tracțiune, ce înconjoară tubul **2** de spălare și ghidare. Arcul elicoidal **8** permite, prin revenirea sa, la ieșirea sapei expandabile dintr-o garnitură de prăjini **9**, prin care a fost introdusă la talpa sondei, expandarea sapei și aducerea brațelor cardanice inferioare **4** și brațelor cardanice superioare **5**, în poziție orizontală, ilustrată în fig. 2 .

La partea superioară a tubului **2** de spălare și ghidare, este dispus un centror **10**, ce asigură poziția optimă a sapei față de axul sondei și față de pereții garniturii de prăjini **9**, deasupra căruia se află un rișlag cu bilă **11**, și un niplu **12**, ce servește, drept cap de prindere la extragerea mecanică a sapei expandabile, cu cablu și rac de prindere.

Garnitura de prăjini **9** mai cuprinde la partea inferioară un șiu **13**, pentru facilitarea extragerii sapei expandabile și un dop de cauciuc **14** pentru menținerea unghiului activ al brațelor cardanice inferioare **4** și brațele cardanice superioare **5**.

După introducerea sapei de foraj expandabile la talpa sondei, se deschide ieșirea la sondă și cu sonda în echilibru hidrodinamic, se ridică circa 2...3 m, de pe talpa sondei, garnitura de prăjini **9**, ce poate fi de dimensiuni 5 1/2 in., pentru degajarea sapei de foraj expandabile. Se reia circulația, cu una din pompe urmărind presiunile. Se execută apăsarea pe sapă prin angajarea șiului **13** pe brațele cardanice superioare superioare **7**. Se trece ușor la turație de regim, apăsare și circulație și se ține tot timpul sonda sub observație. La constatarea uzurii rolelor sapei, se procedează la extragerea sapei prin circulație

inversă sau în cazul, când sonda pierde fluid de circulație, operația se execută mecanic cu ajutorul racului cu cablu.

Înaintarea la talpa sondei presupune exercitarea unei apăsări pe sapă, ce se realizează prin prăjinile de foraj care sunt supuse la flambaj și la torsiune impusă de rezistența rocii. Pentru a se diminua efectul flambării între sapa expandabilă și prăjini, se interpun prăjinile grele care trebuie să echivaleze cu greutatea lor, tocmai valoarea apăsării pe sapă. De asemenea, se are în vedere ca trecerile de la o secțiune la alta să nu fie brusc executate, pentru a se evita pericolul ruperii prin oboseală a garniturii.

Revendicare

Sapă de foraj, expandabilă, prevăzută cu role dințate, fixate la capătul unui tub de spălare și ghidare, **caracterizată prin aceea că** este prevăzută cu niște urechi de fixare (**3**), dispuse pe tubul (**2**) de spălare și ghidare, pe care sunt articulate niște brațe cardanice inferioare (**4**), corespunzătoare fiecărei role dințate (**1**), prevăzute cu niște elemente tăietoare (**a**), iar la partea superioară a fiecărui braț cardanic inferior (**4**), este fixat un fus cardan (**5**) ce se află în interiorul unei role lărgitoare (**6**), la extremitatea căruia, este montat un braț cardanic superior (**7**) fixat la rândul său, la partea superioară, pe extremitatea unui arc elicoidal (**8**), ce înconjoară tubul (**2**) de spălare și ghidare, arcul elicoidal (**8**) asigurând expandarea sapei de foraj și aducerea brațelor cardanice inferioare și superioare (**4** și **5**) în poziție orizontală, la ieșirea din extremitatea garniturii de prăjini (**9**).

Președintele comisiei de examinare: **ing. Gurzău Ioan**
Examinator: **ing. Comănescu Romița**

(51) Int.Cl.[6] E 21 B 10/32;
E 21 B 7/00;

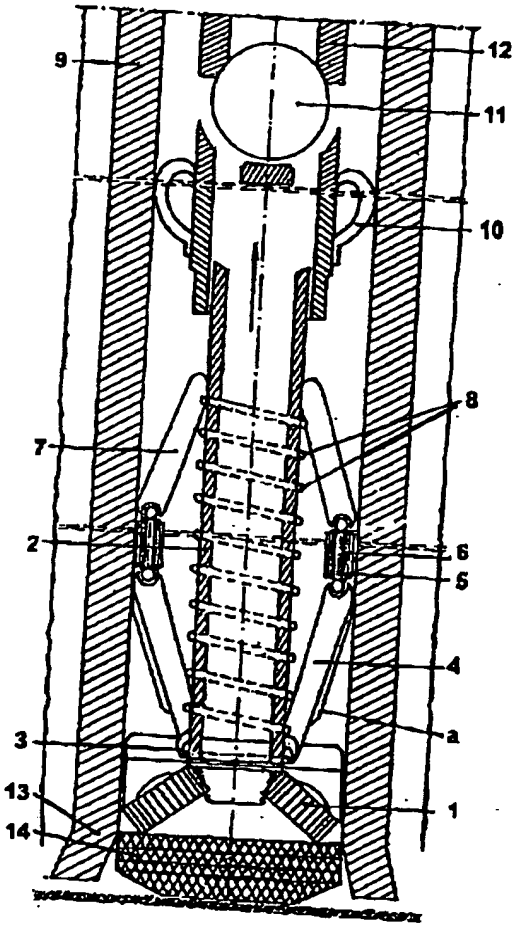


Fig. 1

(51) Int.Cl.[6] E 21 B 10/32;
E 21 B 7/00;

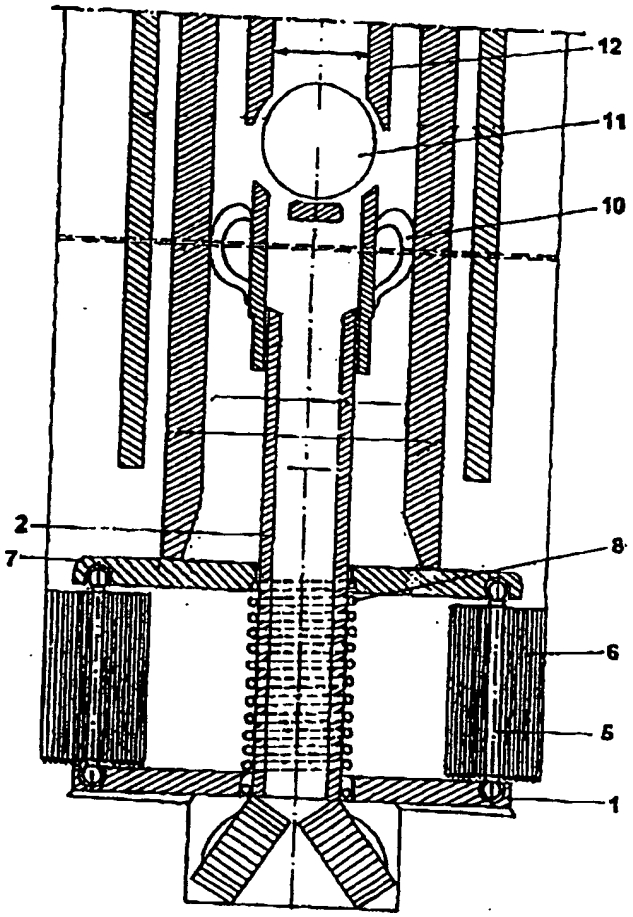


Fig. 2

(51) Int.Cl.[6] E 21 B 10/32;
E 21 B 7/00;

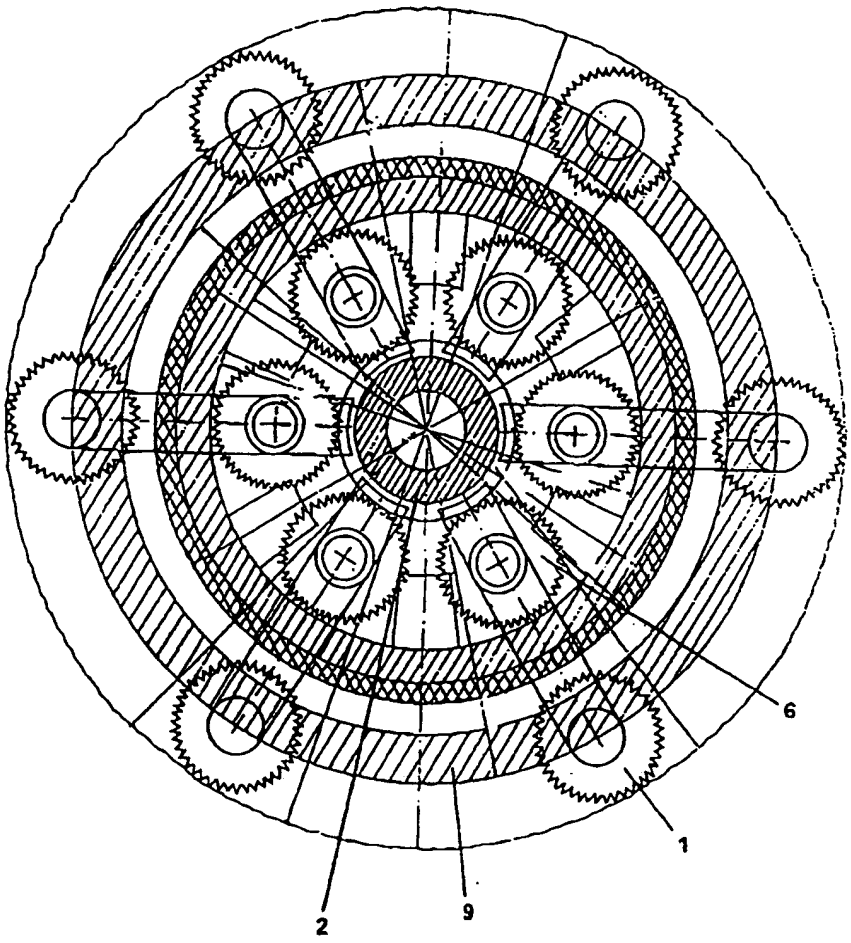


Fig. 3

Editare și tehnoredactare computerizată - OSIM
Tipărit la: Oficiul de Stat pentru Invenții și Mărci

STATE OFFICE FOR PATENT AND TRADEMARKS
Bucharest

ROMANIA

[seal]

[11] Patent No.: **113267 B1**
[51] Inc.Cl.[6] **E 21 B 10/32;**
E 21 B 7/00;

[12] PATENT

The decision granting the patent can be revoked within 6 months of its publication

[21] No.: **94-00770**

[22] Date of filing: **5/9/1994**

[30] Priority:

[41] Date of publication of application:
BOP No.

[42] Date of publication of the decision granting the patent:
5/28/1998 **BOP No. 5/1998**

[45] Date of issue and publication of patent:
BOP No.

[61] Patent Amendment:
No.

[62] Resulting from Application:
No.

[86] PCT International Application:
No.

[87] International Publication:
No.

[56] Technical Study Documentation:
RO 77396

[71] Applicant: **OPREA STAN, BRASOV, RO, FILIP FLORIN NICOLAE, BRASOV, RO;**

[73] Owner: **OPREA STAN, BRASOV, RO, FILIP FLORIN NICOLAE, BRASOV, RO;**

[72] Inventor: **OPREA STAN, BRASOV, RO, FILIP FLORIN NICOLAE, BRASOV, RO;**

[74] Agent:

[54] EXPANDABLE DRILLING HOE

[57] **Summary:** the patent refers to an expandable drilling hoe, used for drilling inside the wells meant for fluids, in mining and other industrial work. The expandable drilling hoe ensures the introduction of the cutting parts into the bottom of the well and their activation without pulling out the unit, due to the fact that it consists of several dented rolls [1], each at the end of a washing and guiding tube [2]. At the lower end of the washing and guiding tube [2], there are some fastening handles [3], on which are installed lower gimbal joint arms [4], corresponding to reach dented roll [1]. Each lower gimbal joint arm [4] is fixed into a gimbal joint shaft [5] which is located inside an enlargement roll [6], at the end of which is installed an upper gimbal joint arm [7]. The upper gimbal joint arm [7] is attached onto a helicoidal spring [8], which ensures the expansion of the drilling hoe.

Claims: 1
Figures: 3

[figure]

Fig. 1

[vertical text in lower left margin:] **RO 113267 B1**

The patent refers to an expandable drilling hoe, used for drilling inside the wells meant for fluids, in mining and other industrial work.

We are familiar with a drilling hoe with multiple rolls consisting of enlargement, absorption, guidance and dirt collection sub-components.

The enlargement sub-component includes an upper flange which provides a coupling with the drilling unit and which is joined to a lower flange through a tubular body and some ribs.

Peripheral cogs, as well as some supports to which are attached some intermediary cogs, are fastened to the lower flange. Sub-components used for displacing rocks are attached to the intermediary cogs. A tubular shaft, attached to a flange containing an absorption pipe, is mounted on the tubular body, through radial-axial bearings.

The absorption sub-component is solidly attached to an enlargement sub-component.

The guidance and collection sub-component contains a tubular body, to the edge of which is attached a trunk-conic platform with its larger base pointing upward, into which are drilled circulation holes.

To the tubular body and the platform are attached some ribs and inside the body is mounted, through radial-axial bearings, a tubular shaft, having one end attached to a lower flange of the absorption sub-component with the help of some positioning pegs. Between the body and the shaft, there is a circular space full of lubricant, sealed from the outside through circular gaskets.

The expandable drilling hoe, according to the patent, ensures the introduction of the cutting parts into the bottom of the well and their replacement, when used, without extracting the beam pump rig unit, due to the fact that it is provided with fastening handles, attached to the washing and guiding tube, on which are installed some lower gimbal joint arms, corresponding to each dented roll, provided with cutting parts. On the upper portion of each lower gimbal joint arm, a gimbal joint shaft is fixed, which is located inside an enlargement roll, at the end of which is mounted an upper gimbal joint arm, the upper portion of which is attached, in turn, to the edge of a helicoidal spring which surrounds the washing and guiding tube. The helicoidal spring provides the expansion of the drilling hoe and brings the lower and upper gimbal joint arms into a horizontal position, at the open end of the beam pump rig unit.

The use of the patent generates the following benefits:

- reducing the large number of runs performed in order to operate the replacement of the hoes;
- increased operating safety;
- reducing drilling costs.

We provide below an example of implementing the patent in connection with fig. 1-3, which represent:

- fig. 1, vertical view through the expandable drilling hoe found inside the beam pump rig unit
- fig. 2, vertical view through the expandable drilling hoe in fig. 1, in a working position;
- fig. 3, front view, from the bottom up, of the expandable drilling hoe in fig. 2.

The expandable drilling hoe, according to the patent consists of dented rolls **1**, attached to the lower end of a washing and guiding tube **2**. Some lower gimbal joint arms **4**, corresponding to each dented roll **1**, are installed with the help of fastening handles **3** on washing and guiding tube **2**. There can be, for instance, six of them. The lower gimbal joint arms **4** are provided with cutting parts which become active in the hoe's working position.

The upper portion of the lower gimbal joint arms **4** supports a gimbal joint shaft **5** which is located inside an enlargement roll **6**. The number of enlarging rolls **6** is equal to the number of lower gimbal joint arms **4**. Upper gimbal joint arm **7** is mounted at the upper edge of the gimbal joint shaft **5**. The top part of this arm is attached to the edge of a traction helicoidal spring **8**, which surrounds washing and guiding tube **2**. Helicoidal spring **8** allows, when it reverts to its initial position, for the expandable hoe to be expelled from the beam pump rig unit **9**, through which it was introduced into the bottom of the well, and for the lower gimbal joint arms **4** and upper gimbal joint arms **5** to be brought to the horizontal position shown in fig. 2.

On the upper edge of the washing and guiding tube **2**, is installed a centering device **10**, which provides the optimum position of the hoe

with respect to the axis of the well and the walls of the beam pump rig unit **9**, above which is located a ball and seat **11** and a nipple **12** which is used as a gripping end in case of mechanical extraction of the expandable hoe with a cable and a claw coupling.

The beam pump rig unit **9** also includes, on its bottom part, a casing shoe **13**, which facilitates the extraction of the expandable hoe and a rubber stopper **14** which maintains the active angle of the lower gimbal joint arms **4** and upper gimbal joint arms **5**.

After the expandable hoe is introduced into the bottom of the well, the end of the well is opened and with the well in a hydro-dynamic balance, the beam pump rig unit **9**, which can have the size of 5½ in, is lifted about 2 to 3 meters off the bottom of the well, in order to release the expandable drilling hoe. The operation is resumed, with one of the pumps following the pressures. The hoe is pressed on by applying casing shoe **13** to the upper gimbal joint arms **7**. We slowly shift to standard rotation, pressure and operation and the well is maintained under constant observation. Upon finding that the rolls of the hoe are worn out, we proceed to extracting the hoe through a reverse run or, in case the well is losing operating fluid, the operation is performed manually, with the help of the cabled claw coupling.

Advancing to the bottom of the well supposes pressing on the hoe, which is done through the beam pump units which are subject to burning and torsion imposed by the resistance of the rock. In order to reduce the impact of the burning between the expandable hoe and the beam pump units, heavy beam pump units are interposed, which have to be equivalent to their weight, precisely the value of the pressure exerted on the hoe. Changes from one type of action to another are also monitored so that they are not performed abruptly, in order to avoid the danger of breaking the unit through tear.

Claims

The expandable drilling hoe provided with dented rolls, attached to the end of a washing and guiding tube, **characterized by its** fastening handles [3] attached to a washing and guiding tube [2], on which are installed some lower gimbal joint arms [4], corresponding to each dented roll [1], equipped with cutting parts [a]. The upper portion of each lower gimbal joint arm [4] is fixed to a gimbal joint shaft [5] which is located inside an enlargement roll [6] at the end of which is mounted an upper gimbal joint arm [7], the upper portion of which is in turn fixed to the edge of a helicoidal spring [8] which surrounds the washing and guiding tube [2]. The helicoidal spring [8] provides the expansion of the drilling hoe and brings the upper and lower gimbal joint arms [4 and 5] into a horizontal position at the open end of the beam pump rig unit [9].

President of the examining board: **Engineer Gurzău Ioan**
Examiner: **Engineer Comănescu Romița**

[51] Inc.Cl.[6] E 21 B 10/32;
E 21 B 7/00;

[figure]

Fig. 1

[51] Inc.Cl.[6] E 21 B 10/32;
E 21 B 7/00;

[figure]

Fig. 2

[51] Inc.Cl.[6] E 21 B 10/32;
E 21 B 7/00;

[figure]

Fig. 3

Computerized editing and technical editing - OSIM
Printed by: State Office for Patents and Trademarks

TRANSPERFECT | TRANSLATIONS

AFFIDAVIT OF ACCURACY

I, Kim Stewart, hereby certify that the following is, to the best of my knowledge and belief, a true and accurate translation performed by professional translators of *Patent RO 113267 B1* from Romanian to English.

Kim Stewart
TransPerfect Translations, Inc.
3600 One Houston Center
1221 McKinney
Houston, TX 77010

Sworn to before me this
9th day of October 2001.

Signature, Notary Public

OFFICIAL SEAL
MARIA A. SERNA
NOTARY PUBLIC
[illegible] for the State of Texas
My commission expires 03-22-2003

Stamp, Notary Public

Harris County

Houston, TX

DOCUMENT INFO

Name:	B282.PDF
Location:	K:\Current_Projects\ALLPRINT\HB\54377-79\PRINTS-3
Size:	357KB (364,604 bytes)
Modified:	Sunday, Feb 24, 2002 06:30:56 PM

DOCUMENT INFO

Octrooiraad

Nederland

(12A) Terinzagelegging (11) 9001081

(19) NL

(54) **Buisvormig omhulsel voor dichtingsmateriaal.**

(51) Int.Cl.5: E21B 33/12.

(71) Aanvrager: Eijkelkamp Agrisearch Equipment B.V. te Giesbeek.

(74) Gem.: ir. L.W. Kooy o.s.
Octrooibureau Vriesendorp & Gaade
Dr. Kuyperstraat 6
2514 BB 's-Gravenhage.

(21) Aanvrage Nr. 9001081.

(22) Ingediend 4 mei 1990.

(32) --

(33) --

(31) --

(62) --

(43) Ter inzage gelegd 2 december 1991.

De aan dit blad gehechte stukken zijn een afdruk van de oorspronkelijk ingediende beschrijving met conclusie(s) en eventuele tekening(en).

De uitvinding heeft nu tot doel een maatregel te verschaffen voor een buisvormige omhulsel van de in de aanhef genoemde soort, waardoor dit buisvormige omhulsel sterker uitgevoerd kan worden, b.v. door een grotere wanddikte en/of sterkere materiaalsoort, en derhalve een grotere (buig)sterkte zal bezitten, waarbij de tijd die benodigd is voor het bezwijken van het omhulsel en ook het toetreden van de vloeistof naar het vulmateriaal zelfs kan verminderen ten opzichte van de bij de bekende omhulsels benodigde tijd daarvoor.

Hiertoe heeft de uitvinding het kenmerk, dat de wand van het buisvormige omhulsel voorzien is van tenminste één verzwakking.

Ter plaatse van de verzwakking zal de omgevingsvloeistof relatief vlug kunnen doordringen tot in het vulmateriaal. Daarbij zal ook de binnenzijde van het omhulsel in aanraking komen met de vloeistof, zodat de wand van het omhulsel tweezijdig onder inwerking zal staan van de vloeistof en sneller zal verzwakken, om aldus het vulmateriaal onder het zwellen daarvan het omhulsel uiteen te laten drukken en de weg vrij te maken voor grootschaliger toetreding van de vloeistof naar het vulmateriaal. Bij een wanddikte gelijk aan die van de bekende omhulsels zou hierdoor de watertoetreding en het uiteendrukken van het omhulsel en daarmee het uiteindelijke afdichtingsproces in vergelijking met de stand van de techniek veel sneller verlopen, zodat derhalve de mogelijkheid geschapen wordt om de wand van het omhulsel dikker uit te voeren.

Volgens een voorkeursuitvoering zijn meerdere verzwakkingen in de vorm van perforaties voorzien, die met voordeel gerangschikt kunnen zijn in de vorm van een zich in hoofdzaak in de richting van de buisas uitstrekkende lijn. Alternatief kan de verzwakking uitgevoerd zijn in de vorm van een dikteverminderíng in de wand van het buisvormige omhulsel.

De uitvinding zal nu nader beschreven worden aan de hand van de in de tekening weergegeven voorbeelduitvoering.

Fig. 1 toont een omhulsel volgens de uitvinding, zonder vulling.

Fig. 2 toont het omhulsel van fig. 1, in gevulde toestand, waarbij een deel van de wand weggebroken is.

Fig. 3 toont een alternatieve uitvoering van een omhulsel volgens

de uitvinding.

Fig. 4 geeft in verticale doorsnede een boorgat weer, waarin een reeks omhulsels volgens de uitvinding neergelaten is.

Het omhulsel van fig. 1 is een kartonnen koker 1, met een uit een spiraalvormig gewikkelde baan 14 gevormde wand 2 van ongeveer 1 mm dikte, welke wand voorzien is van een plaatselijke verzwakking in de vorm van een lijnvormige reeks perforaties 3. De koker heeft een doorsnede van bijvoorbeeld 5 centimeter. De perforaties hebben bijvoorbeeld een diameter van ongeveer 1-2 mm en kunnen op een hart op hart afstand van elkaar gelegen zijn die iets groter is dan hun diameter. De wand 2 is hier opgebouwd uit drie lagen stevige kraftliner, in plaats van zoals voorheen wel het geval was uit twee lagen testliner met een of twee tussenliggende lagen kraftliner. De namen testliner en kraftliner zijn in de handel bekend. Testliner is in vergelijking met kraftliner zwak en snel verweekbaar zodat de nieuwe koker een relatief sterke wand heeft.

In fig. 2 is de koker van fig. 1 weergegeven, echter hier gevuld met bentonietkorrels 6. Een uiteinde van de koker is gesloten middels een kartonnen plaatje 4, terwijl het andere uiteinde gesloten is met behulp van een lijmlaag 5. In deze vorm worden de kokers volgens de uitvinding naar de plaats van gebruik getransporteerd, tijdens welk transport zij niet of nauwelijks beschadigd zullen geraken vanwege de relatief grote sterkte van de kokers.

In fig. 3 is een alternatieve uitvoering van de koker volgens de uitvinding weergegeven, waarbij de wand 2, die relatief dik is, voorzien is van een gleufvormige diktevermindering 15, welke zich in de lengterichting van de koker uitstrekt.

In fig. 4 is een boorgat 7 weergegeven, welk boorgat zich vanaf het maaiveld 8 door zandlaag 10, veenlaag 9, kleilaag 11, enz. naar beneden toe uitstrekt, bijvoorbeeld tot op een diepte van 60 m. Het boorgat 7 kan bijvoorbeeld dienst hebben gedaan bij seismisch onderzoek. Het boorgat 7 is aan zijn omtrek voorzien van een verbuizing 12, waarbinnen een aantal met bentoniet gevulde kokers 1 van fig. 1 en 2 neergelaten zijn. Nadat de gewenste stapelhoogte van de kokers bereikt is, wordt de verbuizing 12 uit het boorgat 7 getrokken, waarna het grondwater, waarvan de grondwaterspiegel 13 weergegeven is, toe

kan vloeien tot in het boorgat 7. Het toegestroomde grondwater zal in aanraking komen met het buitenoppervlak van de wand 2 van de kokers 1. Tegelijkertijd zal echter water doorsijpelen door de perforaties 3, waardoor ook het binnenoppervlak van de wand 2 in aanraking komt met het grondwater en ook daar zal verweken. Mede door de door het zwellende vulmateriaal uitgeoefende druk zal de koker 1 al gauw opensplijten langs de lijn gevormd door de aanvankelijk aanwezige perforaties 3, om aldus vrij snel een grotere doorgang te verschaffen voor grondwater en het vulmateriaal ruimte te bieden voor verder uitzetten. De diameter van de kokers is hierbij zodanig gekozen dat tussen de koker en het boorgat ruimte is voor het uiteenwijken van het omhulsel. De totale tijd die nodig is voor de bentonietvulling om de plaatselijke doorsnede van het boorgat 7 af te dichten, zal nu niet of nauwelijks noemenswaardig toenemen ten opzichte van de tijd die daarvoor benodigd is bij bekende technieken.

C O N C L U S I E S

1. Buisvormig omhulsel voor een hoeveelheid vulmateriaal, dat bestemd is om ingebracht te worden in bijvoorbeeld een boorgat en werkzaam is na inwerking van een vloeistof daarop, waarbij het omhulsel een wand bezit, die vervaardigd is van een materiaal, dat onder inwerking van de vloeistof verzwakt, met het kenmerk, dat de wand (2) van het buisvormige omhulsel (1) voorzien is van tenminste één verzwakking (3).

2. Buisvormig omhulsel volgens conclusie 1, met het kenmerk, dat de wand (2) van het buisvormige omhulsel (1) voorzien is van een reeks perforaties (3).

3. Buisvormig omhulsel volgens conclusie 2, met het kenmerk, dat de perforaties een lijnvormige reeks (3) vormen, welke zich in hoofdzaak in de richting van de buisas uitstrekt.

4. Buisvormig omhulsel volgens conclusie 1, met het kenmerk, dat de verzwakking (15) gevormd wordt door een vermindering in de dikte van de wand (2).

5. Buisvormig omhulsel volgens conclusie 4, met het kenmerk, dat de verzwakking (15) lijnvormig is en zich in hoofdzaak in de richting van de buisas uitstrekt.

6. Voortbrengsel gekenmerkt door het buisvormig omhulsel (1) volgens één der voorgaande conclusies, waarbij het omhulsel gevormd is met een onder invloed van vloeistof zwelbaar materiaal (6), bijvoorbeeld bentoniet, en het omhulsel voorzien is van afsluitmiddelen (4, 5).

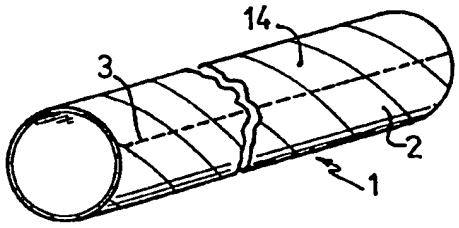


FIG. 1

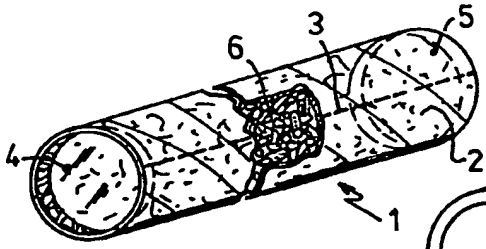
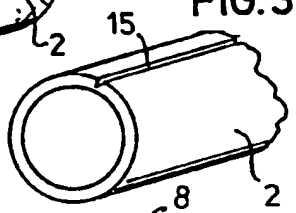


FIG. 2

FIG. 3



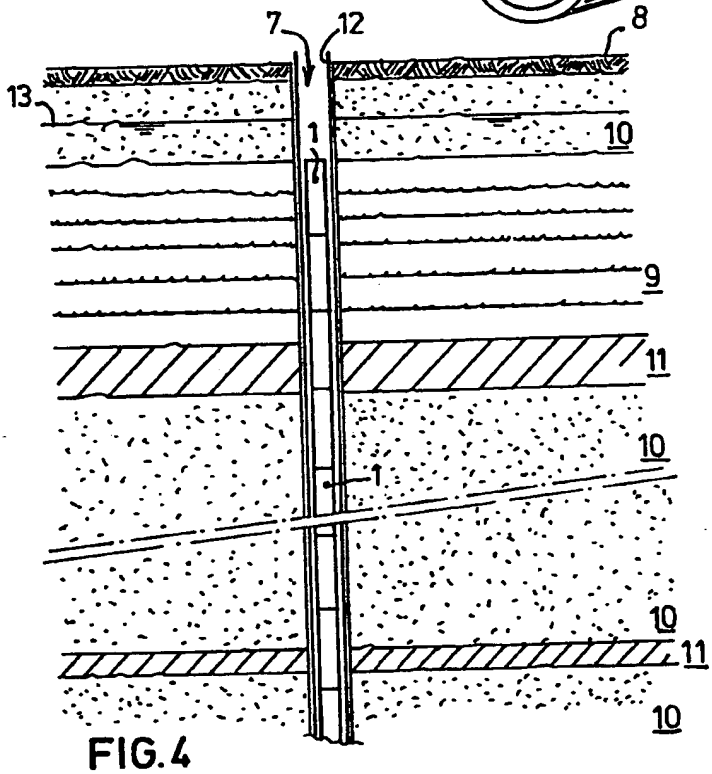


FIG. 4

Patent Office
[logo]
The Netherlands

(12A) Application (11) 9001081
(19) NL (The Netherlands)

(54) Tubular casing for holding sealing material
(51) Int. Cl.[5]: E21B 33/12
(71) Applicant: Eijkelkamp Agrisearch Equipment B.V. in Giesbeek
(74) Authorized representative: L.W. Kooy, Engineer
Patent Office Vriesendorp & Gaade
Dr. Kuyperstraat 6
2514 BB The Hague

(21) Application No. 9001081
(22) Filed on May 4, 1990
(32) --
(33) --
(31) --
(62) --

(43) Made public on December 2, 1991

The invention aims to provide a method involving a tubular casing of the type mentioned in the introduction, in which the tubular casing can be made stronger, e.g., by means of a greater wall thickness and/or stronger types of materials, and as a consequence possess greater (bending) strength, in which the time needed to cause the casing to disintegrate, as well as the penetration of liquids into the filling material may even decrease when compared to the time needed for this with current casings.

This feature of this invention is that the wall of the tubular casing has at least one weakened area.

At the location of the weakening, the surrounding liquid is able to penetrate relatively quickly into the filling material. Consequently, the interior of the casing will come into contact with the liquid, with the effect that the casing wall will be influenced by the liquid from both sides which causes it to weaken more quickly, thereby allowing the filling material to expand due to its swelling and facilitate the large-scale entrance of the liquid into the filling material. In the case of a wall thickness that is the same as the currently used casings, water penetration and expansion of the casing and the subsequent sealing process will therefore take place much more rapidly in comparison with the current status of the technique, which in turn provided the possibility of constructing a tube with a thicker wall.

According to a preferred application, several weakened spots were applied in the form of perforations preferably arranged in a straight line along the tube's axis. Alternatively, the weakening may be applied in the form of a reduction in the wall thickness of the tubular casing.

The invention will now be described in more detail on the basis of the sample application as shown in the drawings:

Fig. 1 shows a casing according to the invention, without filling material.

Fig. 2 shows the casing of Fig. 1 with the filling in place, with part of the wall broken away.

Fig. 3 shows an alternative application of a casing according to the invention.

Fig. 4 provides a vertical cross section of a drill hole, in which a series of casings according to the invention have been inserted.

The casing of Fig. 1 consists of a cardboard tube 1, with a wall 2 formed by a spiral-wound strip 14 of approximately 1 mm in thickness, with the wall having a local weakening in the form of a line-shaped series of perforations 3. The tube has a diameter of approximately 5 cm. The perforations have a diameter of approximately 1-2 mm and may be spaced apart from center to center slightly more than the diameter of the holes. The wall 2 in this example is constructed of 3 layers of sturdy kraft liner, instead of the previously used two layers of test liner with one or two central layers of kraft liner. The terms test liner and kraft liner are commonly known in the industry. Test liner is weaker than kraft liner and softens more rapidly, so that the new tube has a relatively strong wall.

Fig. 2 shows the tube of Fig. 1, but in this case it is filled with bentonite granules 6. One end of the tube is closed by means of a cardboard disc 4, while the other end is closed off with a layer of glue 5. The tubes according to the invention are transported in this form to the work site. Due to the relatively great strength of the tubes, little or no damage should occur to them as a result of the transportation.

Fig. 3 shows an alternative application of the tube according to the invention, wherein the wall 2, which is relatively thick, has a groove-shaped thickness reduction 15, situated along the length of the tube.

Fig. 4 shows a drill hole 7, which penetrates through the top soil 8, the sand layer 10, peat layer 9, clay layer 11, etc., to the bottom, to a depth, for instance, of 60 m. The drill hole 7 can, for example, have served in a seismic research project. The contour of the drill hole 7 is protected by a well casing 12, into which several bentonite-filled tubes 1 of Fig. 1 and 2 have been lowered. When the desired stacking height of the tubes has been reached, the well casing 12 is pulled out of the drill hole 7, so that the groundwater, whose groundwater level 13 is indicated,

can flow into the drill hole 7. The penetrating groundwater will make contact with the outer surface of the wall 2 of the tubes 1. At the same time, the water will also seep through the perforations 3, causing the inside surface of the wall 2 also to come into contact with the groundwater and cause a softening of the filling material. Aided by the pressure caused by the swelling of the filling material, the tube 1 will rapidly split open along the line formed by the perforations 3 that were made, and quickly provide increased penetration of the groundwater and make room for the filling material for increased expansion. The diameter of the tubes has been chosen in such a way that there must be room between the tube and the drill hole wall for the outer casing to disintegrate. The total amount of time needed for the bentonite filling material to seal the diameter of the drill hole 7 will not increase considerably compared to the time that is required in current techniques.

CLAIMS

1. Tubular casing for holding a certain amount of filling material, for the purpose of being inserted into—for example—a drill hole, which is activated when a liquid acts upon it, wherein the casing has a wall made of a material that weakens when it comes into contact with liquid, in which the wall (2) of the tubular casing (1) has at least one weakened area (3).

2. Tubular casing according to claim 1, in which the wall (2) of the tubular casing (1) has a series of perforations (3).

3. Tubular casing according to claim 2, in which the perforations form a straight line (3), which primarily stretches along the length of the tube axis.

4. Tubular casing according to claim 1, in which the weakening (15) is formed by a reduction in the thickness of the wall (2).

5. Tubular casing according to claim 4, in which the weakening (15) forms a line and primarily stretches along the length of the tube axis.

6. Application characterized by the tubular casing (1) according to one of the foregoing claims, in which the casing contains a filling material (6) that expands when it comes into contact with liquid, e.g., bentonite, and in which the casing is closed off by caps (4, 5).

[see source for figures]

TRANSPERFECT | TRANSLATIONS

AFFIDAVIT OF ACCURACY

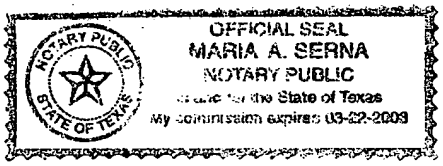
I, Kim Stewart, hereby certify that the following is, to the best of my knowledge and belief, a true and accurate translation performed by professional translators of *Patent 9001081* from Dutch to English.

Kim Stewart
TransPerfect Translations, Inc.
3600 One Houston Center
1221 McKinney
Houston, TX 77010

ATLANTA
BOSTON
BRUSSELS
CHICAGO
DALLAS
DETROIT
FRANKFURT
HOUSTON
LONDON
LOS ANGELES
MIAMI
MINNEAPOLIS
NEW YORK
PARIS
PHILADELPHIA
SAN DIEGO
SAN FRANCISCO
SEATTLE
WASHINGTON, DC

Sworn to before me this
9th day of October 2001.

Signature, Notary Public



Stamp, Notary Public

Harris County

Houston, TX